



## **AAR Significant Activities Report August 19, 2002**

### **SAFETY R&D**

**Airport Surface Technology:** Jim White (AAR-411) and representatives of the Keweenaw Research Center installed an elastomeric anti-icing bed on the FAA Ramp at the William J. Hughes Technical Center. The 8 foot-wide by 200 foot-long test section contains a specialized limestone aggregate bound to the asphalt shoulder with epoxy. This winter the bed will be treated with anti-icing agents (propylene glycol) and exposed to a series of icing events. Friction readings will measure the ability of the test bed to melt and/or prevent an ice pavement bond. Successful testing at the Technical Center will accelerate field-testing at Chicago's O'Hare International Airport.

**Airport Technology Wildlife Mitigation Strike R&D Program:** The U.S. Air Force and the Wave Band Corporation (Torrance, CA) recently signed a Technology Investment Agreement (TIN) to develop and test a prototype radar dedicated to the detection of birds at airports. The project has a budget just over 1 million dollars and is funded under the auspices of the Dual Use Science and Technology program (DUST). The DUST is a partnership program between industry, the U.S. Air Force and FAA. The FAA Airport Technology R&D Branch initiated this project in 2000 and has worked closely with its U.S. Air Force counterparts to get the project to be selected and funded by the DUST program. Under this program, the FAA is leveraging significant amounts of research dollars to develop technology that will greatly enhance safety at airports (over 6,000 bird strikes were reported in 2001).

**Modeling of Fuel Tank Inerting:** FAA researchers successfully used a 1/4-scale model of the center wing tank of a B747 to determine the accumulation of nitrogen into the 6-bay tank, produced by a fuel tank inerting system. Excellent agreement was obtained between the model and full-scale B747 data for the time-dependent depletion of oxygen concentration in each bay. The researchers employed the model to examine different nitrogen distribution schemes to arrive at an optimal design. For example, the researchers found that the most efficient method of inerting the tank was to deposit all of the nitrogen-enriched air in a single location, providing a lightweight, easily installed deposit system for an operational aircraft. Bill Cavage (AAR-440) and Ole Kils, a co-op student from Rutgers University, authored the final report DOT/FAA/AR-02/51, *Inerting a Boeing 747SP Center Wing Tank Scale Model with Nitrogen-Enriched Air*.

**FAA/Boeing Flight Test Meeting:** FAA and Boeing have recently agreed to work together to conduct flight tests on an on-board inert gas generating system (OBIGGS) for center wing fuel tank inerting.

On July 30, representatives from the FAA, Boeing and Pratt & Whitney met at the Technical Center to examine the OBIGGS installed in the FAA 747SP and to discuss the status of all the tasks that need to be accomplished to meet the tight flight test schedule. Currently, flight tests are planned to commence on October 15, 2002, in the Pratt 747SP at Plattsburgh, NY. Representatives from Shaw Aero Devices, Parker Hannifin Corporation, Parker Aerospace, and Air Liquide also attended the meeting. These companies participated in the design of the OBIGGS installed in the FAA 747SP and furnished system components.

**Inspection Systems Research:** The FAA's Airworthiness Assurance Nondestructive Inspection Validation Center (AANC) continues to support inspection efforts related to the AA587 crash. Interactions continued with Airbus and American Airlines to determine where the AANC might support the validation of new Airbus inspections. In July, meetings were held at the American Airlines Facility in Tulsa, OK, to discuss the inspection of the Airbus A-300 vertical lug. The proposed inspection was part of an American Airlines proposal to Airbus in lieu of the currently recommended ultrasonic inspection, which requires the removal of the vertical tail section. American Airlines proposed to use an Isonic 2001 ultrasonic system to inspect the vertical lug from the end of lug while the vertical tail is in place on the aircraft. Since the number of aircraft experiencing the 0.35g overload is very small (less than 1 per year), Airbus decided to stay with the more reliable inspection from the sides of the lug. This does require removal of the tail section. The AANC will continue to support the Airbus pulse-echo inspection technique as it moves into the NDI Manuals.

**FAA/NASA Workshop on Key Characteristics for Composite Material Control:** Curtis Davies (AAR-450) and Larry Ilcewicz (NRS for Composite Materials) presided over the workshop, organized by AAR-450 and held in Chicago, IL, on August 6-8. The purpose of the workshop was to solicit industry comments from both material suppliers and original equipment manufacturers on the two drafts on recommended criteria and guidelines to develop material and process specifications for composite materials. The two drafts were developed through the efforts of AAR-450 under a contract to Wichita State University. The workshop was the first step towards proposed policy and rulemaking by the Small Airplane Directorate. The workshop attendance included over 90 participants. The FAA was represented by Peter Shyprykevich (AAR-450), the Small Airplane Directorate, and the Aircraft Certification Offices. Comments on the two prepared documents will be considered and implemented before the documents are published as AAR technical reports.

**GAO Meeting on Hazmats:** A meeting was held at the Technical Center on August 1 with personnel from the GAO, Fire Safety Branch (AAR-440) and Aviation Security R&D (formerly AAR-500) to discuss the potential use of hazardous materials in an airplane as a possible weapon by terrorists. GAO requested the meeting after witnessing a demonstration of the exploding aerosol can simulator, developed by AAR-440 as a standard cargo fire test requirement for halon replacement agents, during a VIP facility tour on July 11 which included the GAO Comptroller General and VIP's from the Transportation Security Administration and FAA's AOA-1 staff.

**IATA Visit:** Thomas DeFiore and John LaPointe visited the International Air Transport Association (IATA) to familiarize themselves with the IATA's newest capabilities to provide useful trend data/information for FAA research program on transport airplane uncommanded rudder and lateral control events analysis. Within the past year IATA has established a Safety Trend Evaluation, Analysis and Data Exchange System (STEADES), which is founded on the well-proven British Airways Safety Information System (BASIS) software designed to monitor thousands of incident

reports from the apparently trivial to in-flight emergencies. STEADES went a step beyond the BASIS safety information scheme in that it includes analysis to identify trends and other conclusions. It is the only global safety event database providing analysis of incidents aimed at improved safety that is based on an open reporting system compatible with other reporting systems. This system has the potential to provide substantial useful information and analysis for a variety of safety research initiatives including subject rudder and lateral control research. Agreement was reached for FAA to contract with IATA to query all available BASIS and STEADES accident and incident records for non-commanded rudder or lateral control events, to classify and categorize these events and make recommendations for fruitful research areas, which have the potential to reduce future accidents and incidents. A draft has already been completed and circulated at AAR and ANM for review.

**National Hispanic Coalition Conference:** Cathy Bigelow (AAR-400) attended the 24th Annual Training Conference of the National Hispanic Coalition of Federal Aviation Employees held July 23-25. The conference was held in Miami Beach, FL. Training included sessions on Personal and Professional Enrichment, The Core of Leadership, and Physically Fit for Work and Life. The conference also included several panels on diversity initiatives within the various FAA organizations. One of the highlights of the conference was a panel of Senior Executives who spoke on their respective LOB diversity efforts. The panel included Dan Salvano, ARA, Nick Sabatini, AVR, Fanny Rivera, ACR, Jeff Griffith, AAT, Steve Zaidman, AAF, Marcos Costilla, ATB, and a representative of API from the Miami Office. Unfortunately, the majority of the SES panels members had to leave before the question and answer portion of their session.

**Airshow at Oshkosh:** AAR-410's Ryan King and Donald Gallagher attended the 50th AirVenture 2002 airshow in Oshkosh, WI, July 23-29. They staffed an exhibit at the FAA Safety Center along with other AAR-400 personnel (Ken Knopp and Chris Dumont). This is the second largest airshow in the world. Over 500,00 people attended with over 18,500 operations performed (takeoffs and landings).

**JFK Airport Visit:** AAR-411's Ryan King and Jim White escorted a group of summer interns (Traci Stadtmueller, Nick Subbotin, and Joe Cannizzaro) and Maryland Vietnamese Mutual Association interns (Chris Scott and Bruce Lam) to JFK International Airport on August 8. The field trip included visits to the runway 4R arrestor bed installation and taxiway deviation laser range-finder test sites. Members of the Port Authority of NY & NJ provided commentary on the wide variety of construction projects under way at JFK. Seeing the operation of a complex and busy airport like JFK from "inside the fence" gives one a much greater appreciation for what it takes to make it all work so safely and effectively.

## **HUMAN FACTORS R&D**

**Human Factors Seminar:** The Human Factors Program (AAR-100) sponsors a continuing series of seminars and short training courses on topics of significance to the FAA ARA community. As part of this series, Professor Michael Crognale of the University of Nevada-Reno gave a well-received seminar on Lighting, Illumination and Human Vision at the FAA on August 7, 2002. There were 21 attendees from AND, ASU and AAR. Professor Crognale discussed concepts of light, luminance and illuminance measurement, human visual capabilities (including developmental changes), and color

vision in the context of aviation human factors and engineering. His presentation was enhanced by the ample and pertinent audio-visual graphs, slides and video footage used to illustrate the material.

**Safe Flight 21:** Dr. Kevin Williams attended a meeting in Washington, DC to brief representatives of Embry-Riddle Aeronautical University (ERAU), Prescott, AZ campus on the results of recent interviews of pilots using Capstone Phase I avionics. The interviews were conducted by members of the Safe Flight 21 Human Factors Group. The ERAU representatives intend to ask the FAA to fund a similar project in the Prescott, AZ area to reduce the number of near misses reported around that airport.

**Laboratory Tour:** Representatives of the William J. Hughes Technical Center's Human Factors Group and the laboratory support groups conducted a briefing and tour for representatives of the Civil Aviation Administration of China, CAAC. Participants included people involved in training, administration, air traffic control, and aviation psychology.

## **ENVIRONMENT R&D**

**FAA/NASA MOA:** A FAA/NASA cooperative memorandum of agreement concerning Aircraft Noise Reduction Technology (FNA/09-02-01) became effective June 20, 2002. The purpose of this Memorandum of Agreement (MOA) is to build upon and expand the longstanding relationship between the FAA and NASA with respect to environmental compatibility. Specifically, this MOA aims to form the basis upon which the FAA and NASA may establish programs and plans to achieve the joint long-term national goal of containing objectionable aircraft noise within airport and compatible land use boundaries. This MOA is written in accordance with the guidelines established by FAA/NASA Memorandum of Understanding (MOU), FNA 09 concerning Aviation Environmental Compatibility, dated October 6, 2000.

## **SECURITY R&D**

**Explosives Detection Tomography System (EDtS):** The Heimann Systems EDtS is an automated dual-energy x-ray imaging system that collects x-ray attenuation data from multiple views to determine the presence of explosives in checked luggage. Representatives from the AAR-520 Bulk Explosives Detection Research and Development Program coordinated the delivery of the Heimann Systems EDtS to the William J. Hughes Technical Center and its installation and calibration in July 2002 under a Cooperative Research and Development Agreement between the FAA and Heimann Systems. Explosives and non-explosives data collection was performed over a 4-week period. This information will be used to enhance the explosives detection software algorithms.  
Jason Reap, AAR-520, 609-485-4965